



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

A CITY PLAN FOR WASTE DISPOSAL

BY GEORGE A. SOPER,

Consulting Engineer, New York.

If by plan is meant a detailed program, the reading of this paper will prove disappointing. It is not possible to make a city plan for waste disposal without knowing the city to which it is to be applied. Many things which can and should be done in disposing of the wastes of a large city are quite impossible in a small one, and methods which are suitable for a country village cannot be thought of for a city of even moderate size. This applies equally to the methods of collection and disposal. The composition of the wastes differs essentially, and geographical, climatic and the social characteristics of the population have all a material effect upon the problem.

There are, however, some underlying principles which should be observed in all work of this kind and if by plan is meant a statement of the more important principles concerned in the collection and disposal of a city's wastes, some help may be obtained by reading this paper.

Definitions. By city wastes is usually meant those broken, used and discarded materials which are customarily removed from the houses and streets of cities at public expense. In small towns and in some villages the work of removal is done at the cost of the householders and even in large cities some private scavenging is usually carried on.

The term wastes strictly includes sewage as well as solid refuse, but it is seldom so employed. Nor is snow generally spoken of as a part of the city's wastes, although it is a waste in the strictest sense and may be a very costly one to remove. Dead animals, termed offal, although generally removed at public expense, are seldom included in the term waste. The refuse produced by stables is customarily removed at private cost. Sometimes trade wastes are disposed of at private and sometimes at public expense. Neither the refuse of stables nor of manufacturing establishments is customarily referred to as city wastes.

In the usual acceptance of the term, city wastes comprise street sweepings, kitchen refuse, ashes and rejected papers, fragments of cloth, and metals and wood from dwelling and business houses.

Value in Wastes. Some value exists in practically all forms of municipal wastes, but in most cases this value is not great enough to warrant the pains which it is necessary to take to save the useful materials at the household. Furthermore, such matters are valuable only when in considerable quantity. Only when the salable ingredients are gathered together in large amount can they be disposed of to commercial advantage. Because of the value which lies in certain kinds of waste materials, when in quantity, it is customary more or less thoroughly to sort out the mixed wastes after they are collected with the object of extracting those materials which can be sold. This sorting is usually imperfectly done and unsanitary practices are common in connection with it.

Examples of the waste materials which it generally pays to separate and dispose of by sale are bottles, metals and rags. Frequently there is enough grease in the kitchen waste of restaurants, hotels and private houses to pay for collecting and rendering it. In some cases, private scavengers collect such material without charge, finding their compensation in the material itself. More often, especially in small places, kitchen refuse is kept apart from other wastes at the household and is disposed of by feeding to poultry or hogs. This process is not objectionable when carried on with reasonable regard to the sanitary requirements.

Cleanness is Costly. Speaking generally, it is an expensive undertaking to dispose of city wastes in accordance with the best sanitary principles. It costs money to keep a city clean. It rarely happens that municipal wastes can be rendered inoffensive and innocuous without considerable expense. In some instances cities have been able, by conducting their scavenging departments upon modern business principles, to recover a part of the cost of disposal, but such instances are rare. Successful work of this kind is usually confined to cities of 100,000 inhabitants or more. These alone can afford to pay the salaries necessary in order to obtain the services of the best administrative officers and maintain such a plant and force as are required for thoroughly efficient work.

By far the most difficult municipality to deal with satisfactorily from the scavenger's standpoint is the town of from 10,000 to 50,000

inhabitants. The methods employed for the disposal of the wastes of places of this size are frequently unsanitary and unsatisfactory in the strongest sense of those terms.

Need of Coöperation. A great deal of the difficulty which lies in the way of keeping a city clean lies in the attitude which the average citizen takes with regard to the wastes. It is taken as a matter of course that the wastes should be promptly disposed of, but there are few persons who care to assist in the disposal. Old papers, fruit skins, ashes, garbage and the dead bodies of domestic animals are thrown in the streets, or, what amounts to the same thing, put out in improper receptacles, on the assumption that somebody, whose duty it is to maintain municipal cleanness and order, will remove them. This burden is carelessly imposed by thousands upon a few. To dispose of a city's wastes is an arduous undertaking and every citizen who values cleanness and order in public places should desire to make the work as light as possible. In fact, no city plan for waste disposal can be satisfactory which does not provide that those who produce the wastes shall coöperate in facilitating their removal. Ordinances should be passed prohibiting the littering of streets, providing for the placing of wastes in proper receptacles and the location of receptacles in suitable positions.

Nor will it be sufficient to make rules and regulations without arranging for their enforcement. The magistrates whose duty it is to hear complaints and violations of the municipal regulations should be required to do their duty in helping the city scavengers to keep the city clean.

Continuous vs. Occasional Cleanness. A principle which should be remembered in making a plan for waste disposal is that it is better to keep a clean city clean than to clean a dirty city at intervals. To maintain a condition of cleanness is more expensive than to maintain a condition of dirtiness, but it is nevertheless the ideal toward which it is desirable to strive. The city which has a cleaning-up day once a year, once a month or once a week, as the case may be, is usually a dirty city. The periods of cleanness are brief and serve only to give a glimpse of a state which should be continuous.

It is more important for a city to be clean than is commonly realized. Dirty highways encourage dirty households and dirty households, dirty persons. This relation is very close. It is most apparent in those parts of cities in which the dwellings are crowded

and the population dense. Here many mercantile and domestic functions ordinarily performed within doors are carried on in the streets. It is of the greatest importance that those parts of a city which are most likely to become dirtiest should be kept cleanest. Nothing less than scrupulous cleanliness should be considered satisfactory in the poorest parts of cities. The fact that the streets of a crowded tenement district may be very dirty without attracting notice has nothing to do with the matter.

Disease and Dirt. It is well to remember that wastes sometimes, but not always, are dangerous from the standpoint of disease. No form of infectious illness is produced, or is transmissible, by the odors arising from garbage or decaying animal or vegetable matter. A dead horse in the streets, killed by accident, may produce disgust and even symptoms of nausea, but it is incapable of giving rise to typhoid fever or any other communicable disease. Kitchen garbage does not customarily furnish a suitable culture medium for the propagation of disease germs. Consequently even were such material to be inoculated with the wastes of a sick room, it need not be feared that the disease germs will multiply.

This does not in any sense remove the necessity for promptly and permanently disposing of putrescible material. It merely changes the argument. It places the necessity of proper disposal upon the ground of nuisance, where it belongs. Dirt should be removed because it is dirt. Filth should be promptly and permanently disposed of because it is filthy. Nuisances from undue accumulations of city wastes should be prevented because they interfere with the reasonable comfort, well-being and efficiency of the citizens.

The relation between dirt and disease lies in the fact that carelessness with the one kind of waste leads to carelessness with other kinds and indifference to the harmless sort is generally accompanied by indifference toward that sort which is dangerous.

Dangers to Health. Wastes which are dangerous to health are produced in every city and their existence should not be overlooked by those who are charged with the disposal of the city wastes. In spite of the vigilance of public health authorities, infectious material from patients suffering with tuberculosis, typhoid fever, scarlet fever, diphtheria and many other diseases is occasionally thrown out with the refuse of houses for the city scavengers to remove. In cities provided with sewerage systems, it is rare for the dejecta of typhoid pa-

tients, or, in fact, the infectious wastes of any disease, to be genuinely disinfected before being flushed into the sewers, and in towns which do not have sewers, some of the products of disease are often thrown out under more or less disguise. Not infrequently, employees of the department charged with the duty of collecting garbage and other household refuse are privately paid to take away bedding and other material believed by the householders to be unsafe because of its use in the sick room.

It is essential, that whatever disposition is made of the wastes which are collected, there should be little or no chance that infectious material shall produce sickness. Therefore the collections should be handled or picked over as little as practicable. When this work can be done on a large scale with the aid of mechanical contrivances and under competent supervision, the reasonable objections which can be made to it are in large part overcome.

Such separation as is required for the purpose of facilitating collection and disposal should be made as far as possible at the household. New York divides its household wastes into three parts: kitchen wastes, called garbage; ashes, including metals and glass; and refuse, made up largely of non-putrescible and easily inflammable material. The garbage is delivered to a contracting company which extracts the grease. The ashes and similar material are used for filling in low-lying land.

Methods of Final Disposition. In England, it is customary to collect all the refuse of the houses in one receptacle and to burn the material in furnaces called destructors. Many large and small cities in Europe employ this principle. Frequently a sufficient amount of heat is produced in the burning to raise steam in boilers and so produce electricity for lighting and other useful purposes.

On the continent of Europe, the decomposable wastes of small cities are often made into compost. In America considerable use is made of the principle of burying. Either of these two methods may be carried out without serious objection, provided the amount of waste to be disposed of is not too great and land of suitable location and cost can be secured.

The apparatus, such as destructors, reduction plants, vehicles for the collections and receptacles for temporarily storing the wastes of the households and streets until they can be removed by carts, differ in different places according to local circumstances and especially

with the size of the municipality. For the most part, the scavenging apparatus in use in American and European cities and towns is lamentably crude and unsatisfactory. The carts, particularly, are awkward, heavy, unsanitary and hard both on man and beast. But little progress has been made in developing efficient apparatus or methods of scavenging.

The plan of flushing the pavements of cities has some good and bad points and, on the whole, when properly done is desirable. The best examples of this work are in Europe. Machine brooms are among the most useful types of apparatus for street sweeping. The patrol system of collecting street refuse is excellent in crowded thoroughfares, but should not be necessary elsewhere.

Summary. In the foregoing remarks, attention has been called to some of the essential principles which should be held in mind in arranging for the disposal of the wastes of a city. It is desirable to employ the services of a competent engineer to devise the details. Emphasis should be placed upon the following points:

Coöperation is necessary between those who produce the wastes and those who dispose of them.

Unnecessary litter should be prevented.

Legally enforceable rules and regulations should be formulated and the assistance of magistrates insured to enforce them.

It is important to maintain especially clean conditions in those parts of cities which otherwise may become the dirtiest.

Scientific facts should be recognized as to the causation of disease and the necessity of preventing nuisances because they are nuisances admitted.

It should be acknowledged that cleanliness is costly and that it is a wise, though not inconsiderable, investment for a city to keep itself continuously clean.

It is impossible to make standard plans and specifications for the disposal of city wastes which will apply to all situations.

It is desirable to employ a competent person to study the local situation and then make a plan for the disposal of the wastes. A young man who is familiar with the scientific principles of scavenging should be employed to carry out the plan and work out the practical details as the opportunities and requirements of the situation permit.